

STATE OF MONTANA JOB DESCRIPTION



Montana state government is an equal opportunity employer. The State shall, upon request, provide reasonable accommodations to otherwise qualified individuals with disabilities.

Job Title: Communications Technologist **Working Title:** Traffic Signal Specialist

Position Number: 41026, 41029,
88057 **Pay Band:** 6

Division and Bureau: Maintenance
Communication **Job Code Number:** 492236

Section and Unit: **Location:** Various
Helena, MT 59601

FLSA Status: ☒ Non-Exempt ☐ Exempt

Description of the Work Unit:

The Maintenance Division Program provides for repairs and preventive maintenance of state highways, secondary highways, and the various signs, traffic control devices, and structures within the highway right-of-way. The division is made up of the Equipment Bureau; Communication Bureau; Facilities Bureau; Motor Pool; Maintenance Management System; Maintenance Review; State Sign Shop; Maintenance Support Services; MDT's Disaster and Emergency Services; and MDT's Noxious Weed Program.

The Communications Bureau coordinates all engineering, installation, and maintenance for: MDT land mobile communication systems including all two-way mobile and portable radios, relays, and base stations, and MDT's remote weather information systems (RWIS). The Communications Bureau assists in the design, installation, and maintenance of the local and wide area computer networks; the land line telecommunication systems utilized throughout the Department; the permanent and portable variable message signs (VMS) used across the state; the statewide fuel systems for MDT owned fuel sites; and the traffic signal and roadway lighting systems within the state maintained highway right-of-way. The Bureau also manages and oversees the cell phones, smartphones, and satellite phones utilized by MDT personnel.

Job Overview:

The Traffic Signal Technologist is responsible for overseeing, coordinating and performing a variety of traffic signal design, installation, analysis, maintenance and repair activities to ensure optimum performance/functionality, longevity, and safe operations of MDT traffic signal systems. This involves troubleshooting a wide variety of diverse, complex equipment and interconnected systems using methodical analysis and specialized diagnostic equipment to independently identify and resolve problems/issues within assigned area of the state. Duties also include planning, organizing, coordinating, and directing MDT signal communication installation, expansion, and maintenance projects to ensure smooth and efficient system operations that meet the traffic signal needs of the MDT under direction and

remote supervision. These duties often include direct over sight of electrical contractors utilized with exigency purchase contracts for the repair of the traffic signal, or roadway lighting systems, to ensure repairs are completed in an efficient and timely manner. This position does not directly supervise other staff and reports to the Communications Bureau Chief.

Essential Functions (Major Duties or Responsibilities): *These job functions are the essential duties of the position and are not all-inclusive of all the duties the incumbent may be assigned.*

A. Traffic Signal and Roadway Lighting Systems Design, Maintenance & Repair 70% of Time

Oversee, coordinate and perform a variety of traffic signal and roadway lighting design, installation, analysis, maintenance and repair activities to ensure optimum performance/functionality, longevity, and safe operations of MDT traffic signal systems. This involves troubleshooting a wide variety of diverse, complex equipment and interconnected systems using methodical analysis and specialized diagnostic equipment to independently identify and resolve problems/issues within assigned area of the state.

1. Research and determine installation requirements for new or upgraded signal systems by analyzing signal plans, technical specifications and standards, site features, traffic data and equipment requirements to ensure safe and effective installations. Identify additional or alternative installation requirements (e.g., parts, procedures, permits, etc.) necessary and incorporate system diagnostic capabilities to detect early malfunction and ensure data integrity. Analyze and integrate new technologies into existing systems.
2. Develop electronic designs, specifications and schematics to plan and document optimum configurations, materials, and operational specifications for traffic signal systems. Research solutions and alternatives to complex, uncommon or alternative designs to ensure quality and safety while promoting cost-effective installations. Develop new methods and hardware for individualized resolutions for problems involving extensive factors ranging from intricate, inter-related electric circuitry to mechanical integrity, to traffic/weather/geographical considerations using troubleshooting principles and testing the soundness of new approaches, reengineered systems and integrated technologies. This includes the design and specifications of electronic equipment used to detect vehicles, bicyclists, and pedestrians at signalized intersections.
3. Expedite successful installations of traffic signal systems, roadway lighting systems, electrical/mechanical traffic control devices, VMS systems, and various electro-mechanical devices found within the state's highway right-of-way used to convey relevant information to the traveling public such as changeable speed limit signs, radar controlled speed signs, rapid flashing pedestrian warning beacons, and dynamic warning devices by providing oversight, inspections and consultation to ensure equipment is properly installed and operates in accordance with specification requirements. This also includes electronic components (e.g., HID luminaires, lighting contactors, lightning arrestors, traffic signal controllers, time clocks, microwave detectors, emergency vehicle detectors, conflict monitors, vehicle detection systems etc.) and infrastructure (e.g., luminaire poles, mast arms, span wires, pedestrian poles, signal poles, signal indications, controller cabinets, pull boxes, etc.). This involves determining required and optimum components; coordinating with heavy equipment operators, MDT new materials personnel, construction personnel, fabricators, and others to secure necessary authorized materials; and constructing safe and operable systems according to specifications.

4. Analyze, monitor and evaluate traffic signal operations to identify both electronic and mechanical problems and resolve issues in a cost effective manner. This involves troubleshooting utilizing a variety of diagnostic tools (system analyzers, VOLT/OHM meters, oscilloscopes, loop testers, etc.), technical and professional expertise, and available technical specifications to locate problems. Problems in the field frequently require the incumbent to develop original diagnostic methods and procedures according to specific and variable equipment, malfunctions, and field conditions. Provide routine maintenance and inspection of the electronics and signal infrastructure required to operate the signalized intersections.
5. Manage and oversee the traffic signal operations shop containing a large inventory of electronic, mechanical, and construction materials used to maintain, diagnose and repair complex integrated traffic signal and advisory systems to ensure availability for traffic signal and VMS installation and repair projects. Prioritize work schedules based on analysis of most critical needs; current project and anticipated project needs; procure necessary components, tools, and equipment; develop specifications and requisition requests for technical equipment; and track shipping, receiving, and warehousing data communications.
6. Resolve electronic malfunctions with traffic signals, portable/permanent VMS, and other electrical/mechanical devices associated with the conveyance of information for the driving public by identifying physical damage or deficiencies, and other problems to ensure effective system operation. Develop approaches to specific equipment problems by researching or identifying technical documentation, performing hands-on technical repairs or adjustments, and testing the results of diagnostics and solutions to ensure that appropriate repairs have been implemented.
7. Establish, monitor and evaluate traffic system performance and benefits for the MDT Central Control Computer and software including networking to central points, closed loop, distributive and adaptive systems. Review and critique system software and develop signal timing and response plans with computer base optimization.
8. Program and calibrate electronic traffic signal equipment, peripheral traffic control equipment, and VMS systems according to component function, system capabilities, and specifications. This includes programming, calibrating, testing, and adjusting systems as necessary.
9. Review, identify conflicts, and locate underground circuits for all traffic signals affected by construction/maintenance activities within assigned areas to ensure no damage to the existing buried infrastructure occurs during time of construction/maintenance activities along the roadway and to ensure compliance with state law. Assist with locating buried electrical circuits owned and operated by MDT including but not limited to; roadway/pathway lighting circuits, network communication systems within MDT maintenance facilities, RWIS circuits, MDT owned facilities, and other buried appurtenances as requested and as time permits.
10. Assist the communications technologists within the communications bureau with the operation and maintenance of the permanent and portable variable message signs (VMS), the remote weather information systems (RWIS), wireless networks and other electronic equipment operated and maintained by the communications technologist. This involves receiving training and guidance as time permits to learn to deal with communications related equipment and issues independently. Monitor and repair data collection equipment at the site and remotely to ensure information is transmitted appropriately via standard communication tools (phone lines, cellular devices, and computer networks) in order to improve response times to emergencies, increase winter

maintenance efficiency and minimize the traveling public's exposure to hazardous weather affecting roadway conditions

11. Assists maintenance personnel with the maintenance, operation, repair, and replacement of roadway lighting circuits, luminaries, maintenance and appurtenances within the highway right-of-way as requested and as time permits.

B. Project Coordination 25% of Time

Under direction and remote supervision, plan, organize, coordinate, and direct MDT signal communication installation, expansion and maintenance projects to ensure smooth and efficient system operations that meet the traffic signal needs of the MDT and applicable rules and laws.

1. Coordinate traffic signal installation, expansion and repair projects (or any project that affects the operation of the traffic signals within their assigned area) by prioritizing and planning from preconstruction to completion and beyond to ensure conformance with standards and specifications; monitor initial and adjusted priorities; and resolve technical or procedural problems. Perform or oversee appropriate tracking, documentation, and reporting of project details as required.
2. Design, develop and present concepts and traffic signal system layouts to the Communications Bureau Chief. Provide expertise, fundamental data and resources to management relating to substantiating the advantages and disadvantages of large-scale departmental projects.
3. Monitor and evaluate new technologies to identify system enhancements, equipment upgrades, and other improvements. This involves assessing new components, system needs, and compatibility issues; developing cost-benefit analyses; proposing alternatives and enhancements to supervisors; and implementing traffic signal system changes as requested.
4. Assist District and Communications Bureau supervisors as directed with vendor and contract administration. This includes maintaining ongoing liaisons with project vendors, monitoring projects with site visits and reporting problems or deficiencies to supervisors, completing documentation, and processing invoices as required.
5. Act as technical liaison and main point of contact between the Communications Bureau Chief, MDT staff, contractors, vendors, agents of local, state and federal organizations and other interested parties to share knowledge regarding the inter-relationships of all signal communication applications supported by the MDT and Communications Bureau. Coordinate and collaborate as appropriate on any issues related to signal communications in assigned area. Provide technical expertise in the consideration of equipment needs and concerns and provide assistance as needed regarding the design and development of new control systems, new site locations, and equipment specifications of infrastructure, electrical equipments and utilities.

C. Other Duties as Assigned 5% of Time

This position performs a variety of other duties as assigned by the Communications Bureau Chief in support of the department mission and bureau objectives including but not limited to; coordinating special projects; attending meetings and conferences; providing and participating in ongoing training; researching and procuring necessary materials and parts for test and evaluation of new traffic signal equipment to enhance traffic signal operation; researching and writing bid specifications for the purchase of new equipment needed to sustain the departments statewide traffic signal systems and present them

to supervisors for approval; travelling in and out of state to project locations and conferences and meetings and performing other duties as assigned.

Supervision

If this incumbent supervises others, please list each employee supervised and the position number:
This position does not directly supervise other staff.

Minimum Qualifications (Education and Experience):

The required knowledge, skills and abilities are typically acquired through a combination of an associate's degree in electronics or construction technology or related field plus three (3) years of technical experience in electronics or constructions technology related to traffic signal design, operation and maintenance. Job-related experience in traffic signal systems may substitute for education requirements on a year-for-year basis. Other equivalencies will be considered.

Other education, training, certification, or licensing required (specify):

The position requires Level II IMSA Certification and a valid Montana driver's license.

Required Knowledge, Skills, and Abilities

This position requires extensive knowledge of electronics, central network signaling, wireless and telecommunication network methodologies; principles, practices and mechanical design, diagnosis, and repair; system calibration, testing, operation, and maintenance; highway safety issues; construction practices and procedures; and applicable Department, state, and federal standards and requirements including a thorough knowledge of the Manual on Uniform Traffic Control Devices (MUTCD), a working knowledge of the National Electrical Manufacturers Association (NEMA) standards for TS-1 and TS-2 traffic signal cabinets and controllers, and a working knowledge of the National Electrical Code. Electronic and computer diagnoses and troubleshooting require general knowledge of computer programming methods, networking, communication protocols and procedures; specialized analog and digital equipment; and technical troubleshooting methods, procedures, and techniques.

This position requires skill in reading and understanding traffic signal design plans, diagnostic schematics, operations manuals, and technical specifications; calibrating and configuring specialized traffic signal and VMS systems; system analyzers, oscilloscopes, volt meters, soldering irons, and other tools used for equipment calibration, maintenance, and repair; and the ability to communicate effectively both verbally and in writing. The position also requires skill in testing, diagnosing, and resolving technical problems; planning and coordinating work with utilities, contractors, and other state agencies; operating personal computers and specialized software; and safely and effectively operating heavy vehicles and equipment.

This position requires the ability to analyze complex signal and electrical systems; perform work activities under periodic stressful situations; be away from home for consecutive weeks at a time; travel alone in excess of 25,000 (twenty five thousand) miles annually, using various modes of transportation including (but not limited to) snow shoes, snowmobiles, ATVs, four wheel drive pickups, horseback, and helicopter under normal to extremely adverse weather conditions in order to access critical sites located in populated or remote mountain top locations. Also required is the ability to lift or move heavy objects (100 pounds), including electronic equipment and snowmobiles; place signals and electronic devices in vehicles and equipment which requires all types of lifting and maneuvering in cumbersome positions and restrictive spaces such as under dashes and in trunks; and work for long periods of time in all types of weather conditions.

Special Requirements:

List any other special required information for this position

- | | |
|--|--|
| <input type="checkbox"/> Fingerprint check | <input checked="" type="checkbox"/> Valid driver's license |
| <input checked="" type="checkbox"/> Background check | <input type="checkbox"/> Other; Describe |

The specific statements shown in each section of this description are not intended to be all inclusive. They represent typical elements and criteria considered necessary to perform the job successfully.

Signatures

My signature below indicates the statements in the job description are accurate and complete.

| | | |
|-----------------------------|--------------|-------------|
| Immediate Supervisor | Title | Date |
|-----------------------------|--------------|-------------|

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| Manager | Title | Date |
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My signature below indicates that I have read this job description.

| | | |
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| Employee | Title | Date |
|-----------------|--------------|-------------|

Human Resources Review

My signature below indicates that Human Resources has reviewed this job description for completeness.

HR Manager

| | | |
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| Signature | Title | Date |
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